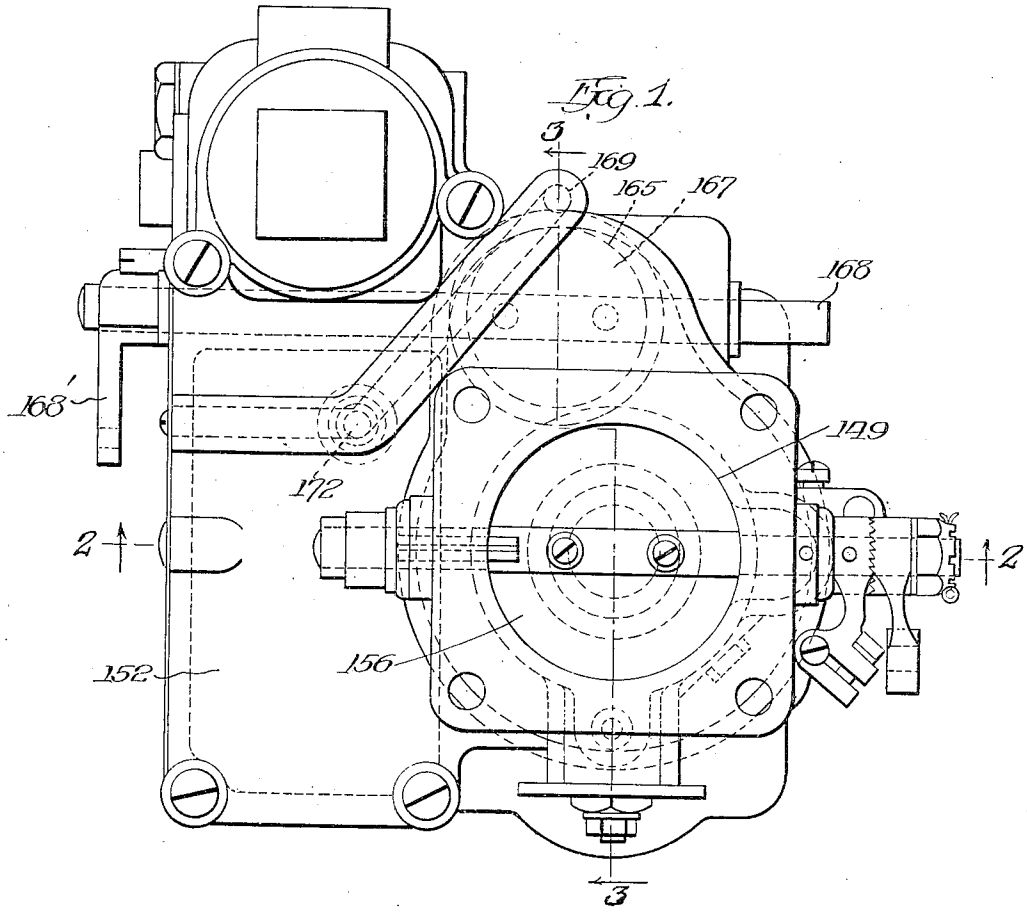
Feb. 11, 1930. F. C. MOCK 1,746,358

AIRPLANE CARBURETOR

Original Filed Jan. 16, 1924 3 Sheets-Sheet 1



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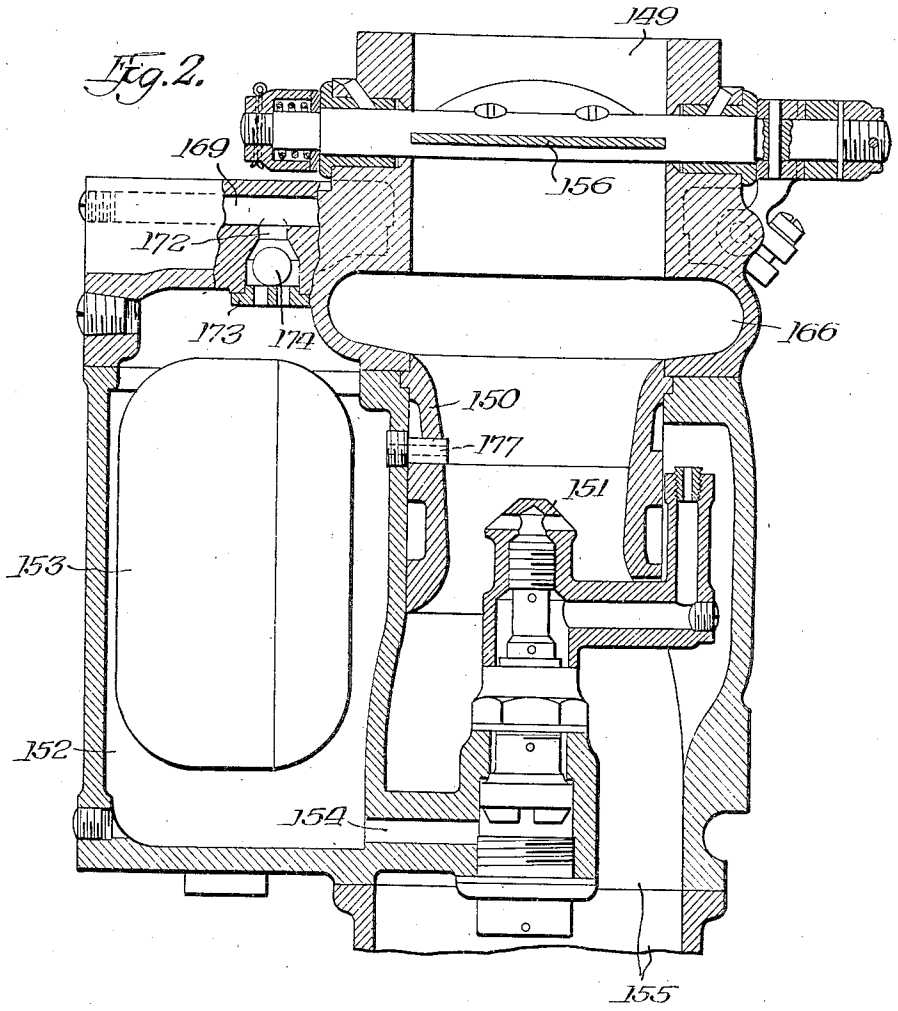
Original Filed Jan. 16, 1924 3 Sheets-Sheet 2

Fig. 2.



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AIRPLANE CARBURETOR

Original Filed Jan. 16, 1924 3 Sheets-Sheet 3

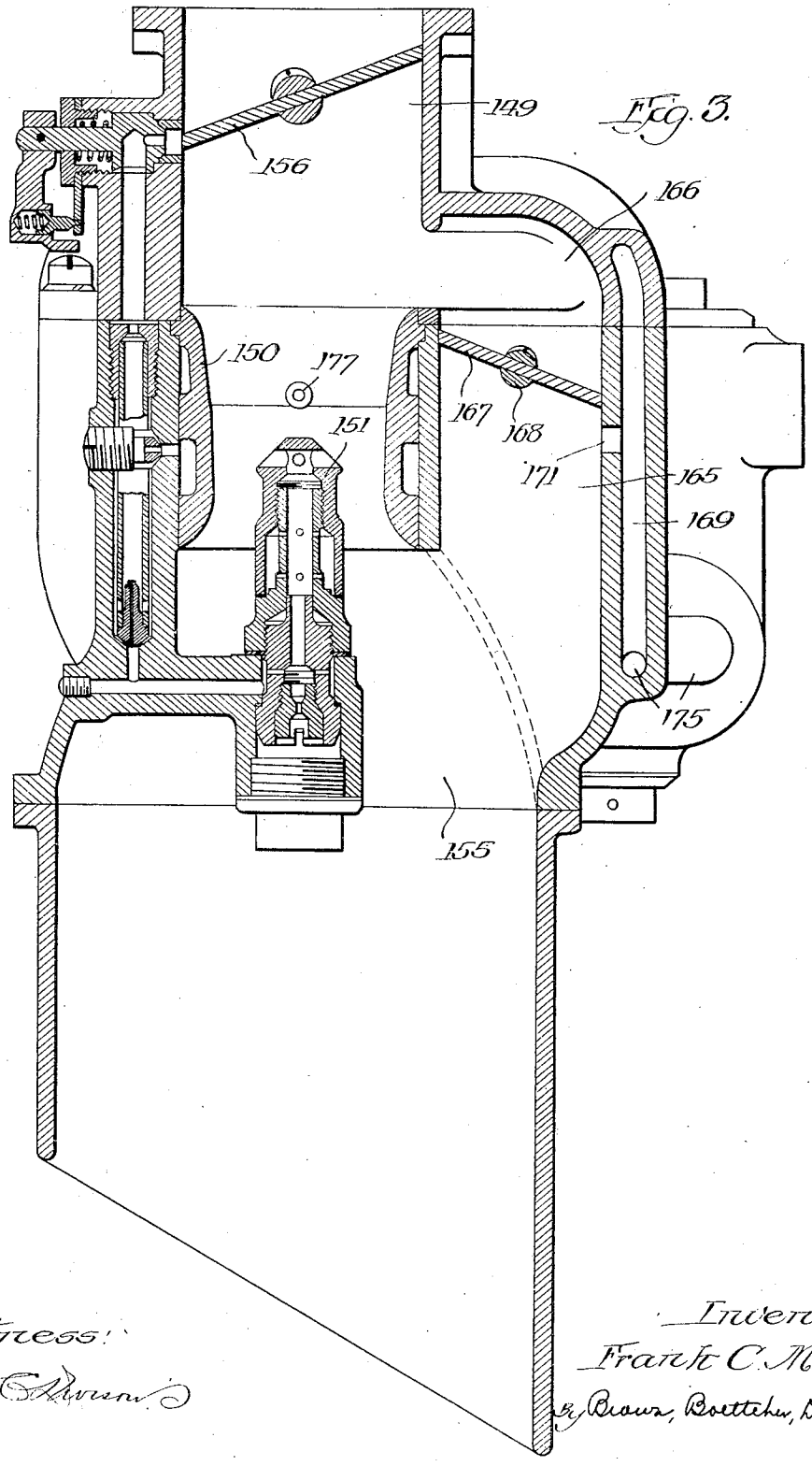

Fig. 3.

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Patented Feb. 11, 1930 1,746,358

UNITED STATES PATENT OFFICE

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AIRPLANE CARBURETOR

Original application filed January 16, 1924, Serial No. 686,474. Divided and this application filed March 18, 1926. Serial No. 95,516.

My invention relates to carburetors, more especially to airplane carburetors, and the object is to provide improved means for efficiently controlling the operation when flying at different altitudes. This application is a division of my co-pending application, Case 29, Serial No. 686,474, filed January 16, 1924, which has matured into Patent No. 1,600,008, dated September 14, 1926.

The various features of my invention are incorporated in the structure disclosed on the drawings, in which:

Fig. 1 is a plan view of a single barrel carburetor;

Fig. 2 is a vertical sectional view taken approximately on line 2—2 of Fig. 1; and

Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 1.

I have shown a single barrel carburetor comprising the carburetor barrel 149 within which is the Venturi tube 150 into which projects the main nozzle structure 151. Along side of the carburetor barrel is the float chamber 152 within which is the float 153 which controls the inflow of fuel to the float chamber. The fuel is conducted from the float chamber to the nozzle structure through the passageway 154. Air is admitted into the carbureting barrel through the air inlet 155, and a throttle valve 156 controls the flow of mixture from the barrel.

I have illustrated an arrangement of altitude control which has equal applicability to single or double barreled carburetors. This altitude control is effected by shunting an additional volume of air around the Venturi tube 150 at high altitude to give the desired increase of capacity for a greater air flow. Such a shunting passageway is illustrated at 165 in Fig. 3, the lower end of this passageway drawing air from the carburetor air intake 155, and the upper end discharging into a substantially annular chamber 166 opening into the carburetor barrel in the upper casing section. A throttle valve 167 on a throttle shaft 168 controls the flow of supplementary air through this passageway. On the outer end of the throttle shaft 168 is an operating arm 168′, from which extends a suitable operating connection to an actuating member in the pilot's cockpit.

I have provided an improved arrangement of back suction control which co-operates with the function of shunting additional air through the passageway 165, to the end of starting and interrupting and graduating a suction effective in the float chamber above the fuel level in accordance with changes of position of the supplementary air throttle 167. A back suction channel 169 is extended lengthwise of the outer wall of the shunting passageway 165, and this back suction channel is placed in communication with this shunting passageway through a port 171 which opens into the passageway 165 below the valve 167. As shown in Figs. 2 and 3, the upper end of the channel or duct 169 is extended across to the top of the float chamber 152, where it communicates with the upper area of the float chamber through a port 172. A spider or ring 173 is threaded into the top of the float chamber to support a ball check valve 174, which check valve is adapted to close the port 172 when the carburetor is inverted. The lower end of the duct 169 is extended laterally into the lower part of the float chamber through the horizontal passageway 175. When the supplementary air valve 167 is closed the pressure effective on the air entrance side of the carbureting chamber will be transmitted through port 171, duct 169 and port 172 into the upper area of the float chamber. As the supplementary air valve 167 is opened a gradually increasing suction is created in the shunting passageway 165, which suction is transmitted through these same ports and air duct to the upper area of the float chamber. When the carburetor is inverted, as in upside down flying, or in other maneuvers, or when the craft is stalling in a loop, the ball check 174 drops onto the seat 172, thereby closing this end of the back suction duct 169 against outflow of fuel, after which any back suction transmitted to the float chamber occurs through the other end of the duct 169 and through the lateral passageway 175. For supplying fuel to the carbureting chamber during this upside down flying, a nozzle 177 may be screwed into the side wall

of the float chamber, to extend through an aperture in the Venturi tube 150, and discharge into this tube at a level considerably above the level of the main nozzle 151. When the carburetor is inverted this nozzle 177 is submerged and supplies a normal running mixture. During such time, the main nozzle transmits a certain degree of back suction to the float chamber above the fuel level; and conversely, when the carburetor is upright the nozzle 177 transmits a certain back suction to the float chamber above the fuel level.

The range of altitude control effected by by-passing air through the passageway 165 is limited by the necessary proportions of the parts. The back-suction altitude control effected through the channel 169 extends the range of control considerably beyond that afforded by the by-pass 165. The one control merges into the other gradually, this resulting from the fact that the suction prevailing in proximity to the port 171 is increased with the opening of the valve 167, and this increasing suction is in turn transmitted to the float chamber.

Having described my invention, I claim as follows:

1. In a carburetor, the combination of a mixture passageway, a Venturi tube in said passageway, a fuel inlet opening into said Venturi tube, a by-pass in shunt of said Venturi tube, a valve in said by-pass, a float chamber supplying said fuel inlet, and a back suction channel communicating with said float chamber and opening into said by-pass on the atmospheric side of said valve.

2. In a carburetor, the combination of a mixture passageway having an air inlet and a throttle valve controlled mixture outlet, a fuel inlet between said air inlet and mixture outlet, a float chamber supplying said fuel inlet, a by-pass around said fuel inlet connecting said air inlet directly with said mixture passageway, a back suction channel communicating with said float chamber and with said by-pass to be subjected to the suction effect in said mixture passageway when said by-pass is opened, and a valve for controlling the passageway through said by-pass and for disconnecting said channel from said mixture passageway.

In witness whereof, I hereunto subscribe my name this 9th day of March, 1926.

FRANK C. MOCK.